CLAIMS

1. A power control system for an electric motor having at least one magnetic bearing, said system comprising a DC/DC converter supplied from a DC link buss connected to a main power supply, said buss supplying power for the electric motor and for a bearing actuator, said converter providing low voltage DC power supplies for a motor controller, a bearing controller and a supervisory controller, the supervisory controller monitoring the main power supply and communicating with the motor controller and bearing controller so as to cause the motor to operate as a generator in the event of a failure of the main power supply to thereby supply power to the DC link buss to maintain operation of the magnetic bearing characterised in that, circuit switching components are connected to the motor winding and selectively switched in a manner causing current generated in the motor winding to flow in one direction into said DC link buss only while the winding voltage is greater than that of the DC link buss.

2. A power control system as defined in claim 2, characterised in that, said circuit switching components comprise first and second switches connected between a first end of the motor winding and the positive and negative sides of said DC link bus, respectively, and third and fourth switches connected between a second end of the motor winding and the positive and negative sides of said D C link bus, respectively, and a parallel diode connected across each switch to oppose the normal motor current flow.

3. A power control system as defined in claim 2, characterized in that, either said first and third or second and fourth switches are turned on to generate said current in said motor winding and immediately said current is generated said switches are turned off whereby the winding voltage rises above said buss voltage and said current flows into said DC link buss.

4. A power control system as defined in claim 3, characterised in that, said switches are IGBT's which are opened when a power failure is detected such

that existing motor current flows through relevant said diodes and into said DC link buss to boost the buss voltage, and when said buss voltage again drops either said first and third, or said second and fourth switches are slosed to short circuit said motor winding and immediately initiate current flow therethrough, whereupon said switches are opened causing the winding voltage to rise above the buss voltage and the generated current is fed back to said link buss.

5. A power control system as defined in claim 4, characterised in that, a capacitor is connected between the positive and negative sides of said link bus to store power fed back from said winding for motor run down.

6. A method of running down a high speed DC electric motor run on magnetic bearings in the event of a failure of the main power supply, said method including the steps of supplying the motor and the magnetic bearings from a high voltage DC buss connected to the main power supply, providing a DC/DC converter to supply low voltage DC power to a magnetic bearing controller and to a motor controller, using switching devices to control the motor operation, sensing a failure of said main power supply and providing a signal to the motor controller, characterized in that, said switching devices are selectively controlled on sensing said failure, to initially feed existing motor current to said buss, detecting when said buss voltage drops below a predetermined value and shorting said motor winding, and as soon as current flow in said winding commences, as a result of the short, removing said short whereby the winding voltage rises to above the buss voltage, feeding the resulting generated current back to said buss, and repeating said selective control as necessary until said motor is run down.

7. A method according to claim 6, characterized in that, a capacitor is provided across said buss to provide a buffer of stored power for said motor run down.

8. A method according to claim 6, characterized in that said step of detecting when said buss voltage drops below a predetermined value is achieved

by detecting a reversal of the current being fed to said buss.

9. A method according to claim 7, characterized in that, said switching devices comprise IGBT switches connected between each end of the motor winding and the positive and negative side of said buss respectively, and a diode connected in parallel with each switch, said diodes enabling said motor to act as a generator and feed current into said buss to assist said capacitor in maintaining the buss voltage until said motor is run down.